A.D. 1849 . . . . N° 12,847.

SPECIFICATION

OF

CHARLES LUDOVIC AUGUSTUS MEINIG.

APPLYING MAGNETISM TO CURATIVE AND SANATORY PURPOSES.

LONDON:
PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY:
PUBLISHED AT THE GREAT SEAL PATENT OFFICE,
25, SOUTHAMPTON BUILDINGS, HOLBORN.
1857.

Price 1s. 8d.

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Applying Magnetism to Curative and Sanatory Purposes.

MEINIG'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, Charles Ludovic Augustus Meinig, of Hamburgh, now residing in London, Merchant, send greeting.

WHEREAS Her present Most Excellent Majesty, Queen Victoria, by Her Royal Letters Patent, under the Great Seal of the United Kingdom of Great Britain and Ireland, bearing date at Westminster, the Seventeenth day of November, One thousand eight hundred and forty-nine, in the Thirteenth year of Her reign, did, for Herself, Her heirs and sucsessors, give and grant unto me the said Charles Ludovic Augustus Meinig, my ex̃ors, adm̃ors, and assigns, Her especial licence, full power, sole privilege and authority, that I, the said Charles Ludovic Augustus Meinig, my ex̃ors, adm̃ors, and assigns, and such others as I, the said Charles Ludovic Augustus Meinig, my ex̃ors, adm̃ors, or assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, in the Islands of Jersey, Guernsey, Alderney, Sark, and Man, and in all Her said Majesty's Colonies and Plantations abroad, the Invention of "Certain Improved Modes or Methods of Applying Galvanism and Magnetism to Curative and Sanatory Purposes;" communicated to me from abroad, in which said Letters Patent is contained a proviso, that I, the said Charles Ludovic Augustus Meinig, should cause a particular description of the nature of the said Invention, and in what manner the same is to be performed, by an instrument in writing under my hand and seal, to be inrolled in Her said Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said in part recited Letters Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said Charles Ludovic Augustus Meinig, do hereby declare that the nature of the said Invention, and in what manner the same is to be performed, are fully described and ascertained in and by the present Specification thereof, reference being had to the Drawings hereunto annexed, that is to say:—

Whereas it has been found that portable magnets, that is to say, magnets attached close to and worn on the human body, exercise a beneficial effect on the same in many cases of disease. And whereas also ailing persons have with like advantage been subjected for some minutes, and even hours, to the influence of powerful elctro magnets held to the body by other persons, or placed in certain positions opposite to them. In the former case the action is mild but constant; in the latter powerful but short. Portable magnets possess the advantage of allowing the patient freedom of movement during their application, whereas the advantage of electro magnets may be considered as consisting in the facilities the offer for modifying, interrupting, and even reversing their effects, by modifying, interrupting, or reversing the electric currents, which are the source of their magnetism.

Now my Invention has,—

Firstly, for its object to combine to a certain extent the advantages of both methods, by employing portable electro magnets instead of constant magnets, which electro magnets are constructed so as to be applied to and worn on the body without the constant aid of the patient himself or others, and so as to allow of the free movement of the patient within the limits always prescribed by their necessary connection with the source of the electric currents from which their magnetism is to be derived. I employ for this purpose pieces of soft iron, of a shape suited to the part of the body to which they are to be applied or fastened, and of forms and dimensions corresponding to the effect intended to be produced; and I wind over and upon such pieces of iron coils of insulated copper or other suitable metal wire, in the manner usually adopted. The poles of the electro magnets project from the coils, and fall at such points of the pieces of iron as, when applied, will be next to the body, or at least not separated therefrom by the coil.

Figure 1 of the annexed Drawings represents a portable electro magnet suitable for application to the wrist of the hand. *a* and *b* are the poles.

c, *c*, the coil through which an electric current is sent by means of the uninsulated ends of the coil being connected with the conductors or poles of a voltaic battery or other source of electricity. *d* and *e* are bands or cords by which the electro magnet is fastened on the wrist with one pole on the upper and the other pole on the under side of the same. The wrist is thereby subjected to the magnetic influence between the poles in a degree and manner proportioned to the electric current by which the iron is magnetized, and to the length or number of windings of the coil.

Figure 2 represents an electr magnet adapted to be applied to and fastened on different parts of the body, with the plane *a*, *c*, *b*, close to the same. *a* and *b* are the poles, c^1 the coil, and *d* a hoop of copper soldered to the iron, and projecting above the coil, so that a band or cord may be drawn through or fastened to it, to keep the apparatus in its place.

Figure 3 represents a band or bandage of leather or other suitable material *a*, *a*, to which rods of iron, *b*, *b*, *b*, are sewed at some distance from and parallel with each other, the rods being made a little thicker at the ends, in order that these may be in a plane with the coil surrounding the middle of the rods. Before the rods are sewed to the leather band, an insulated copper or other suitable metal wire is wound in coils round each of them, as shewn in the Drawing, so as to make them all magnetic, when an electric current is sent through the wire, of which *d* and *c* are the loose and uninsulated ends. d^1 and *e* are strings or cords attached to the ends of the leather band, in order to fasten it round the part of the body which is to be influenced by the electro magnets. When the coil is wound in the same direction round all the rods, the north polarity of all the rods will be in one direction, and the south polarity of all in the opposite; but this arrangement may be modified and varied by winding the coil round the rods in different directions, and thereby magnetizing them differently. Each rod may also have its separate coil, or two or more of them one coil in common; and the different coils may be connected with electric apparatuses of different strengths or modes of operation, and thus one rod or some of the rods may be magnetized more or less, or in different directions than the others, according as it is desired that different influences should be exercised at different points of the electro-magnetic series.

Secondly, when portable magnets are worn close to the skin, it often happens that they sink as it were into the skin, so as to adhere pretty strongly thereto; and this adhesion to the body I consider to be strongly indicative of and conducive to their salubrious effect; but the corrosion of the magnets, which generally takes place in such cases, especially on the side applied to the skin, must no doubt interfere materially and injuriously with the magnetic influence. To exclude, therefore, such interference, without diminishing materially the magnetic influence, or, in other words, to produce the full or nearly the full magnetic influence on the human body by means of portable magnets free from the counteracting or modifying effects of oxide of iron, I cover the magnets with some non-corrosive and not easily permeable substance, making the covering as thin as may be, in order that it may not materially alter the shape or increase the size of the magnets, so as to interfere with their close application, and employing only the densest of materials, in order that the magnets may be protected all over as completely as may be from oxidation. I prefer for the purpose to cover the portable magnets with a layer of gold, precipitated by the galvanic process, or with gutta percha laid on in a fluid state or in a sheet state and then made to adhere to the steel by heat. I find it preferable that the steel should first be covered and afterwards magnetized.

Thirdly, I believe it to be generally known that when two plates or pieces of metals which are galvanically different, such, for instance, as copper and zinc, are applied for some length of time to the skin of the human body at a small distance, say, one quarter of an inch from each other, and metallically connected, a galvanic action or current will arise, in most cases owing to the exhalation or moistness of the skin under and between the plates acting as the moist element between the two different metals, and so producing a perfect galvanic circuit. I believe it to be further generally known, that if two plates of galvanically different metals, as, for instance, one plate of copper and one plate of zinc, be applied to a limb or part of the human body, and close to the skin, in such manner that the said limb or other part of the body is placed between them, and that if they are then metallically connected, a galvanic action or current may arise, passing through that limb or part of the body, if the epidermis, cuticle, or skin under the plates be very thin, and moistened to a certain degree, either by natural moisture, such as perspiration, saliva, &c., or by well-conducting solutions of salts or acids, or if the skin be removed, or even slightly abraded only, if in short the skin be in a condition or under circumstances to allow the current to pass through it, and the plates be of a size and nature suited to the thickness or conducting resistance of the limb or part of the body interposed between the plates. The object of my Invention is therefore, in the third place, to combine the galvanic effects produced by portable galvanic apparatuses constructed on the principles or data just enunciated, with those deriveable from portable magnets or electro magnets. I effect this, firstly, by applying portable magnets or electro magnets simultaneously with galvanic apparatuses of the description aforesaid, there being no connecting body interposed between the magnets or electro magnets and the galvanic apparatus, or only an insulating connection established between them; or, secondly, by introducing portable magnets or electro magnets into apparatuses intended and constructed to produce galvanic effects on the body in the modes before stated, by uniting those magnets or electro magnets metallically to the other parts of such galvanic apparatus, and in such manner that the magnets or electro magnets become either conductors only, or elements in the galvanic circuits; or, thirdly, I make a portable magnet or electro magnet the bearer of the whole metallic part of a galvanic apparatus, and this either (1) by uniting metallically to one part of a portable magnet or electro magnet one or more pieces or sheathings of another galvanically different metal, arranged in such a manner that when the apparatus is applied to the body the steel or metal of the magnet or electro magnet and the piece or pieces or sheathings of the other metal attached thereto shall touch the skin at a small distance from each other, or on two opposite sides of a limb or part of the body, thereby producing, with the moistness of the skin or the limb or other part of the body, the galvanic effects required; or (2) by uniting metallically with a portable magnet or electro magnet pieces or sheathings of two or more galvanically different metals, in such manner that when applied to the skin both or all the metals shall touch the same at small distances or on different sides of a limb, and shall, with the moistness of the skin or the body, produce the known galvanic effects. The galvanic effects in all these combinations will be of course accompanied by the influence of the magnets or electro magnets employed (the latter when excited). To exemplify the manner in which a magnetic and a galvanic effect may be combined by means of portable instruments, I annex Drawings of different apparatuses constructed on this combined principle.

Figure 4 represents a galvanic and magnetic ring to be worn on the finger. *a* is a ring of steel cut through at one place, so that when magnetized it shall present a pole at each of the ends opposite to each other. To each side of this steel ring, and throughout the whole circuit thereof, there are soldered two rings of zinc (*b* and *c*), so that when the instrument is put on the finger the parts in contact with the skin shall present to the same a line of steel with a line of zinc on each side.

Figure 5 represents an apparatus seen from the side to be applied next to the skin. *a* is a portable magnet, to which are soldered two pieces of zinc, *b*, *b*, so as to double over and project beyond the ends of the magnet, so that they may touch the skin in the same plane with the steel. The side elevation, Figure 6, shows how the pieces of zinc are fitted upon the steel.

Figure 7 represents a portable magnet *a*, to which are soldered two pieces of zinc *b*, *b*, and two pieces of copper *c*, *c*, doubled over in the same manner as shewn in Figure 6. If the magnet *a* is made in the form of a hoop, as represented in Figure 8, and applied (for instance) to the wrist, with one pole on the upper and one pole on the under side of the wrist, currents through the wrist will occasionally ensue from one piece of zinc to the opposite piece of copper, while there will be currents along the skin between the zinc and copper plates lying on the same side, and occasionally even between the steel and the copper, or the zinc close to it.

Figure 9 represents a portable steel magnet, to which are soldered in alternate order pieces of zinc *b*, *b*, *b*, and pieces of copper *c*, *c*, *c*, so that when applied to the skin they shall produce a number of currents between the different metals.

Figure 10 represents a portable magnet *a*, to the outer circumference of which there is soldered a ring *b* of zinc, which, in combination with the steel of the magnet and moisture of the skin, will occasion electric currents.

Figure 11 represents a portable horse-shoe electro magnet *a*. The free ends of the legs, *b* and *c*, are metallically coated, that is, the end *b* with copper, and the end *c* with zinc, so that when applied to the skin they shall, in combination with the moisture of the skin, give rise to currents from *c* to *b*.

Figure 12 represents a portable magnet coated with alternate squares of copper *c*, *c*, *c*, *c*, and zinc *z*, *z*, *z*, *z*, which act when applied as before described.

Figure 13 represents two portable magnets *a* and *c*, of a form to be applied behind the ears, and connected metallically with each other by a flexible metal string or strings *f*, *f*, *f*, soldered to both ends, and of such length as to allow the magnets to be placed each behind one ear. *a* is coated with zinc, and *c* with copper or silver. To *a* is soldered a piece of copper *b*, and to *c* a piece of zinc *d*. When the magnets are applied there will firstly arise currents from *a* to *b*, and from *d* to *c* along the skin. These currents having excited the functions of the skin, or the skin being moistened with a solution of salt in water, or removed, currents may pass through the head from *a* and *c*.

Figure 14 represents an apparatus which is adapted to be wound round part of the body, as the leg or thigh. *a*, *a*, are plates of zinc. *b*, *b*, plates of silver. *c*, *c*, *c*, are wires which are spirally twisted in order to allow of some flexure in all directions, and soldered to the plates *a* and *b*. *d*, *d*, *d*, are cords of silk fastened to the wires, and from which are suspended horse-shoe magnets *e*, *e*, *e*. Arranged in this manner, the apparatus exemplifies the simultaneous use which may be made of a galvanic apparatus and magnets, without the latter constituting an active element in the galvanic action. But if the plates *b*, *b*, instead of being made of silver, consisted of magnetized steel, or if the horse-shoe magnets *e*, *e*, *e*, instead of being suspended by silk cords were soldered to the wires *c*, *c*, *c*, we should then have a portable galvanic apparatus, in the galvanic currents of which magnets would form acting parts.

Figure 15 represents a bandage to which is attached a series of portable electro magnets, arranged as shewn in Figure 3, but the ends *z*, *z*, *z*, of the iron rods, have previously to the application of the coil been coated with zinc, and the ends *c*, *c*, *c*, with copper, and all the rods have been connected metallically by means of the flexible string or wire *f*, *f*, *f*. When the apparatus is applied, and the ends of the rods are in close juxta-position to the skin, galvanic currents will occasionally arise between the different metals presented to the body, in addition to the magnetic effect when the electro-magnets are excited. Where I effect the metallic connection between steel and other metals by soldering, I raise the steel, after it has received its intended shape, to a white heat, and then apply brass at the places where the soldering afterwards takes place. The brass melts, and unites with the steel. After that the temperature is lowered to about red heat, when the steel is plunged into a cooling bath, to harden it, as usual. The soldering may then be effected between the brass on the steel and the other suitable metal by means of any of the known soft solders, which do not require such a degree of heat as to impare materially the hardness of the steel. I effect the magnetization, after the soldering has taken place, in the manner usually followed, to avoid impairing the magnetism of the steel by the heat. The galvanic effects of such apparatuses as have been described under this head of my Specification may generally be encreased by covering the same on the side which is not applied to the body with gutta percha, caoutchouc, or some other like impermeable and flexible material, by which the perspiration or moisture will be kept together, and condensed to a certain degree on the parts of the body to which the apparatuses are applied, causing thereby a greater frequency of galvanic action. For I wish it to be distinctly understood that where I have herein-before mentioned a galvanic action or current as ensuing upon the application of any of the instruments described, I do not mean to convey the impression that the same ensues instantly on the application, or of necessity under all circumstances, or that when once begun it continues uninterruptedly, for in this respect much depends on the general state of the skin and body of the person who wears the instrument, and on the part of the body where it is applied. In some cases, too, it may be found necessary to employ artificial moisture, or even to remove the skin, especially when it is desired that currents should pass through the part of the body to which the application is made. Neither do I mean to lay it down as a principle that a metal plate can act as an element in two different galvanic currents at the same time; my object being merely to provide for the contingency of the movements of the body tending to interrupt existing and to form new combinations and currents. The portable galvanic apparatuses to which this head of my Specification has special reference are such as by presenting two different metals metallically connected with each other to the body shall produce galvanic currents only as often as the condition of the skin and body under or between the two metals (whether such condition be naturally or artificially produced) will allow of it, according to galvanic principles. In place of the metals which are usually employed in galvanic combinations, some mineral substances which possess galvanic properties may be used, such as prepared coke and graphite; but as these are not adapted to soldering, they must, when employed, be surrounded tightly by metallic rings, or connected in some other suitable manner to the other parts of the apparatuses, in order to admit of the current. Where I have under this head of my Invention used the words "magnets" or magnetic apparatuses, I desire to be understood as meaning thereby more particularly artificial constant magnets, which are ordinarily made of steel, as being the metal best adapted to receive and retain magnetism. Natural magnets (magnetic ore) may, however, be employed for like purposes, when provided with suitable metallic armatures, which armatures would then have to be employed for the purposes assigned under this head to magnets.

Fourthly, the object of my Invention is to produce constant or long continued effects on the human or other animal body, by means of portable galvanic apparatuses, in which the body or its exhalations are not employed as the moist element in the galvanic circuit, but which apparatuses are complete in themselves, only constructed so as to be conveniently attached to or worn upon the body.

Figure 16 represents a sectional elevation of a portable galvanic apparatus of this description. *a* is a round vessel of porcelain, with a hole at the bottom at x. *b*, the lid has likewise a hole in the bottom at y. *c* is a thin plate of platinum, connected with a copper plug x^{11}, which is fitted and cemented into the hole x. The plate of platinum is surrounded with bichromate of potassa, *e*, *e*, *e*, moistened with a little water, but prevented from touching the copper plug by the cement. Over the bichromate of potassa plaster of Paris in a semifluid state is poured in thin layers successively so as to form a diaphragm, e^2, e^2, in the battery, and somewhat deeper at the sides, in order the better to secure adherence to the sides of the vessel. As plaster of Paris expands in setting, it is advisable that each layer should have set before the next is applied. The rest of the vessel is filled up with thread or fibres of asbestos, *g*, *g*, moistened with dilute sulphuric acid (ten water to one acid), so that when the lid is afterwards put on the different layers of materials contained in the vessel are kept well together. Into the hole of the lid is fitted and cemented a copper plug y^2, having hooks on the inside, as shown in the Drawing. Under and between these hooks, and on the whole inner face of the bottom of the lid, amalgams of zinc, *i*, *i*, in a plastic state, are disposed in a suitable thickness, so that when the lid is put on the amalgams shall closely rest upon the asbestos in the case. The two copper plugs, x^2 and y^2, forming the poles of the battery, are provided either with screws or screw boxes, to be conveniently connected with the conductors. During use the vessel is prevented from opening by bands of gutta percha wound round it in a plastic state, so that when cooled they adhere to the vessel and lid, and thereby prevent them from separating. The apparatus may be worn in a small bag or otherwise, leading the insulated conductors to the place where the current is intended to act. If a greater intensity or a greater quantity of galvanism is required than can be obtained by a single apparatus, I connect two or more similar apparatuses with each other, by screwing the plugs of the different apparatuses together. Thus, for intensity, the lid plug of one is connected with the vessel plug of the next, the conductors being then connected with the free end plugs of the last apparatuses on each side of the series; and for quantity, all the lid plugs for one conductor, and all the vessel plugs for the other conductor, are connected, according to rules well known, and only within the limits of their portability.

Figure 17 is a sectional elevation of four apparatuses connected for quantity, and Figure 18 of four apparatuses connected for intensity. The plugs which are connected together are made respectively as screws and screw boxes, so that when screwed tightly together they shall press the surface of the plugs, projecting slightly from the porcelain against each other. When conducting metal bands are used, as in Figure 17, they are provided with holes for the screws, and introduced between the plugs, thereby connecting the plugs and the bands metallically. In Figure 18 the conductors are screwed to the end plugs, as represented in the Drawings in Figure 17. They are soldered or in any other convenient manner connected with the vessel plugs and with the band connecting the lid plugs. Combined apparatuses, as represented in these Figures, are most conveniently worn in a wooden case, into which they should be made to fit exactly, and from which the conductors may lead to where the current or currents are desired to act. These apparatuses will keep up their action for some length of time, according to the quantity of the bichromate of potassa used, and the power of the current; but it is necessary that new dilute acid should occasionally be added to the upper cells, and also that the amalgams of zinc should be cleansed or renovated when oxidized. I make no claim, however, to this combination of materials as new; and any combination which will keep up constant actions in such batteries without any material discharge of gases will answer the purpose. As conductors for such apparatuses I employ metal wire twisted together so as to allow of some flexure, and insulated in the manner well known; and I unite with the ends to be connected with the battery the screws or other means necessary for that purpose. But those ends which are to be applied to the body (when the current has to pass through or traverse the same) I unite to knobs or pieces of metal or armatures, to which I fasten at the side to be applied to the body pieces of sponge or some other capillary substance, moistened with some good conducting solution, such as a solution of salt or sal ammoniac in water, which will greatly contribute to overcome the conducting resistance of the skin, as is well known; but any other suitable fabric may be used as a conductor, such as wire wound spirally. A conducting solution, or capillary materials moistened therewith, may be applied also directly to the body, and after that the armature or knobs which may be fastened by bandages or otherwise kept in their place on the body. The conductors when insulated may be made of such a length as only to lead the current the shortest way to the body, or they may be wound in portable coils to increase the intensity of the current. Portable galvanic apparatuses such as exemplified in the Drawings last herein-before described, may be employed either for passing the electric fluid through the body, in which case the conductors are applied at two different parts of the body without any immediate connection between them, and connected with the apparatus fastened to or suspended from the body, the circuit being closed by the body, the current passing through the same; or, secondly, the body may be subjected to the influence of currents passing along but not entering the same, as more amply described under the fifth head of this Specification, in which case the insulated conductors themselves may be wound into the desired shape, and applied, their ends being connected together and with the battery, or they may be connected with a portable conducting apparatus such as described under the next following head, the currents of the battery thereby affecting the body as intended; or, thirdly, such batteries may be used for magnetizing portable electro magnets, as described under the fifth head of this Specification. Such batteries, when used for the human body, may likewise be introduced into portable galvanic or magnetic apparatuses, or combined galvanic and magnetic apparatuses, both of the description treated of under the third head, that is to say, by making such galvanic or magnetic or galvanic and magnetic apparatuses, or part thereof, conductors of the currents generated, or combining the current produced by them with the current generated in such portable batteries in the manner exemplified in the Drawing, Figures 19 and 20.

Figure 19 is a specimen of a magnetic apparatus acting as conductors of the battery *g*. A series of magnets a^1, *a*, *a*, a^2, are fastened to a bandage, and connected by wires, except between the second and third, where the wires are connected with the poles of the battery *g*. When the apparatus is applied so that the pieces of sponge *e*, *e*, moistened with salt water, and fastened to the end magnets, lay close to the skin at different places, the current of the battery *g* will pass through the wires and magnets, and between the end magnets a^1 and a^2, through the body, combining a galvanic effect with the influence of the magnets on the body. If the legs of the magnets were covered or connected with alternate copper and zinc plates, Figure 19 would represent a specimen of a galvanic and magnetic apparatus as described under the third head, combined with a portable battery.

Figure 20 represents a galvanic apparatus *a*, in which, when applied, the current of the portable battery combines with the galvanic current, as described under the third head. *z* is a zinc plate; *r*, a copper plate. *z* is connected by the wire at *b* to the platinum pole, and *c* at *d* with the zinc pole of the battery when the apparatus is applied, so that the body constitutes the moist element between *z* and *c*. A double battery galvanic current traversing the body is effected. When the conductors are immediately connected with such portable batteries as described, a constant galvanic current in one direction is sent through the conductors, and by them through or near the body; but for the purpose of modifying, increasing, or varying the effect, the conductors may be connected with the battery or batteries in such manner that the current shall be broken and renewed successively, with or without an additional magneto-electric current, or that the galvanic fluid shall traverse the conductors alternately in two directions, with or without a lengthened interruption between the different currents, and with or without an additional magneto-electric current.

Figure 21 represents a portable apparatus in which the current may be broken and renewed alternately. *p*, *p*, is a wooden box enclosing the apparatus, with handles at the sides by which it may be carried in the hand or otherwise fastened to the body. *a*, *a*, are four batteries connected together so as to supply the quantity of two and the intensity of two. The insulated conductor from the platinum poles connected with the battery at *x* forms the the coil *b*, which is wound over a wooden tube, and is connected at the other end of the coil with a spring *c* (which slides on the cylinder *d*), but is at the same time prolonged in *f* to lead currents to the body. The other conductor is united to the zinc pole of the batteries at g^1, and to a spring *e*, sliding on the cylinder, as shewn in the Drawing. On *d* slides also a third spring *g*, which is fastened to the side of the box, and connected with the wire or string *h*, which forms the second conductor from the body. *k* is a spring case, with its axis going through the side of the box, to be wound up from the outside. The spring turns the wheel *m*, the circumference of which is provided with teeth, which, when the wheel revolves, takes into the teeth of the wheel *n* fixed on an axis *o*, *o*, supported in the sides of the box, and cause the same also to revolve. On the axis *o*, *o*, is fitted a cylinder *d* of copper or other metal, but into which, in the line touched by the spring *c*, when the cylinder revolves, pieces of wood or other suitable insulating substance, *i*, *i*, *i*, are inserted at intervals, so that the spring *c*, when the cylinder revolves, shall alternately touch only the copper or only the insulating substance. When *c* touches the copper of the cylinder, the current will go through the cylinder to the spring *e*, and by this back to the battery, and no part, or at least no material part, of the current will pass the conductors *f* and *h*; but when *c* touches only the insulating substance on the cylinder, the current, being broken in *c*, will pass through *f* to or near the body, and back again through *h*, *g* the cylinder, the spring *e*, to the battery. When a rod of iron or bundles of iron wire are inserted into the coil through the hole *t*, left open in the wooden box for that purpose, there will be, besides the galvanic current, a magneto-electric current traversing the conductors *f* and *h* as often as the current is broken at *c*, this magneto-electric current originating from vanishing magnetism in the iron or iron wires, through the interruption of the stronger (because more perfectly closed) circuit by which the iron or iron wires were magnetized. The wooden case is most conveniently made to open at one side, as represented in the Drawings, to allow of the batteries being taken out and renovated when exhausted, for which purpose the connection at *e* and *x* is made by means of screws. w^2, w^2, is a partition of wood supporting one end of the coil (the other end being supported in the side of the box), and into which the springs *c* and *e* are fastened. The springs must be made so as to press with some force on the cylinder *d*, to perfect the metallic contact.

For the purpose of varying the direction of the current sent through the conductors *f* and *h*, I construct the cylinders and arrange the springs and conductors, as shewn in Figure 22, in which, instead of one cylinder, two (A and B) are fitted on the axis *o*, *o*, being separated from each other and from the axis (if this be made of conducting materials) by gutta percha or some other suitable insulating substance. The cylinders are of wood, but each partially covered with a sheet of copper; that is to say, the cylinder A has a strip of copper all round at that part of its circumference which comes in contact with the spring *v*, but is covered only half way round at the parts where the springs *x* and *y* touch; and in like manner the cylinder B has a strip of copper all round at that part of its circumference touched by the spring *d*, but is covered only half way round on the line touched by the springs x^1 and y^1. The copper parts on A and B are respectively arranged so that the wood of each cylinder is placed exactly opposite the copper of the other, as will be more clearly seen from the horizontal plan of the two cylinders in their relative position, given separately in Figure 23, in which the ribbed or ridged parts represent the copper, and the plain parts the wood. In Figure 22 the copper and wood are respectively designated by the letters *c* and *w*. The springs *x*, x^1, *y*, y^1, *v*, and *d*, all slide on the cylinders, as shewn in the Drawing, and with sufficient pressure to perfect a metallic contact when required. The touching points of *x* and x^1, as also the touching points of *y* and y^1, lay exactly in a straight line parallel with the axis of the cylinder. The touching points of *x* and *y* are exactly opposite to each other, and so are those of x^1 and y^1. The two springs *x* and x^1 are fastened into the partition w^2, w^2, and connected with the positive (platinum) conductor from the coil, and the two springs *y* and y^1, fastened into the side of the box are connected with the negative or zinc conductor. When the cylinder A presents copper to the spring *x* and wood to *y*, the cylinder B will present wood to x^1 and copper to y^1, the current going accordingly from *x* through A, *v*, *f*, to the body or near the body *h*, *d*, B, y^1, back to the battery. But when A in revolving presents copper to *y* and wood to *x*, B will at the same time present wood to y^1 and copper to x^1, the current then going from x^1 through B, *d*, *h*, the body *f*, *v*, A, *y*, and back to the battery. When it is desired to interpose an interruption between the two different currents, I effect this by making copper surround less than half of the circumference of one or both cylinders, by which arrangement both the springs *x* and x^1, and *y* and y^1, for a moment will be precluded from any contact with the copper of the two cylinders, and consequently no current pass through the conductors *f* and *h*. But when the copper of one or both cylinders is made to surround more than the half of their circumference, say, for instance, two thirds, the galvanic circuit will for a moment be closed by that cylinder or cylinders, without affecting the conductors *f* and *h* in any material degree; and when this current is used for magnetizing an iron rod or iron wires inserted into the coil, as before mentioned, there will be a magneto-electric current traversing the conductors *f* and *h*, besides the galvanic current, when the closing of the circuit by the cylinder or cylinders is interrupted, which magneto-electric current originates from the magnetism of the iron rod or iron wires vanishing, wholly or in part, by that interruption. In the apparatuses herein-before described it is of course to be understood that every part should be constructed in proportion to the others, as, for instance, the size of the batteries and the quantity and conducting power of the materials should be proportioned to the dimensions of the coil and the resistance of conduction to be overcome, the length of time of the application, and the nature of the effects desired to be obtained; but all these relations being well known by persons conversant with galvanism and its application, I will only here state, for the sake of exemplification, that when it is desired to produce constant currents in one direction through the body, with good conducting solutions at the ends of the conductors, I employ a single battery, contained in a round porcelain vessel of about three inches diameter and one inch in height, with two or three ounces of bichromate of potassa and sulphuric acid, diluted by ten parts of water to one part of acid. The amalgams of zinc covering the inner surface of the lid and the diaphragms of plaster of Paris are each of one eighth of an inch thickness. This battery I find to maintain its action for several days, or even longer, the asbestos with the dilute acid being renovated, and the amalgams cleansed occasionally. When the lower orders of animals are to be subjected to the currents from such portable apparatuses as described under this head of my Specification, care must be taken, firstly, to fasten the instruments in such a manner and to put the animal under such circumstances that the apparatus may not be broken or its effects interrupted. And, secondly, at the places where the currents are intended to enter or leave the body, to remove every insulating substance, such as hairs, feathers, &c., and even the skin, if it be of an insulating nature, and not adapted to be made a conductor by moistening it with solutions, as before described.

Fifthly, the object of my Invention is to subject the human and other animal bodies to the magnetic effects accompanying conductors of electric currents, by means of portable conducting apparatuses, which, when connected with a suitable source of electricity, shall convey a current or currents round or along the body to which they are applied. When it is desired to surround a part of the body by an electric current, I wind a copper wire of suitable strength to withstand some pressure from without into a spiral of such diameter that it may be easily pushed up or drawn over the body to the part which it is intended to surround, and of the length intended for the apparatus. I then enclose this copper spiral in a tube of leather or other suitable material. To the outside of the leather six or eight bands are sewed at equal distances from each other, parallel with the axis of the tube, and with loose ends, to serve as fastenings for the coil and the apparatus. I then wind insulated copper wire or ribband of a thickness proportioned to the current intended to be sent through it in windings over or round the tube, parallel, or nearly so, to each other, and at right angles to the axis of the tube, so that they form a magnetizing coil for the tube or its contents, in the mode followed for magnetizing iron rods, the wire being of a length and number of convolutions proportioned to the magnetic effect intended to be produced. The ends of the coil are left loose and uninsulated (the extreme end being twisted several times with the last winding, in order to prevent the coil from loosening,) to be connected with the poles or conductors of the electric apparatus. The ends of three or four of the bands are bound together over the coil, to keep the convolutions in their place, or at least to prevent them from separating beyond the length of the tube, after which the apparatus is ready for use. When the tube is pushed up or down the body to the part which is intended to be magnetized (this part forming, as it were, a core to the tube), and fastened to the body by means of the bands not used for the coil, and an electric current is sent through the coil, that part of the body will be affected magnetically by such currents, and the patient will be able to move about within the limits of the connection with the source of electricity. The tube, and accordingly the whole apparatus, may be made straight, or curved, according to the part of the body to which it is to be applied, as far as the mass of the coil and whole apparatus will permit. Instead of copper, any other suitable metal may be used for the inner spiral and the coil; but I consider iron not to be so well adapted, particularly for the inner spiral, owing to its relations with magnetism. The effects may be increased or modified by sewing or otherwise fastening to the inner side of the tube, parallel with its axis, iron rods or iron wire, which, when a current or currents of sufficient power are sent through the coil, will be magnetised, thereby affecting the body. When the tube surrounds the human body closely, so that such iron rods or wires lay close to the skin, a galvanic effect may be combined with the magnetic effect, in the manner described under the third head of this Specification, by connecting the iron rods or wires metallically, by means of copper wire, and sheathing them or otherwise connecting them or some of them with one or more different metals, these metals, and the iron or the different metals connected therewith, when all lying close to the skin, giving rise to galvanic currents, as more amply described under the third head of this Specification. When I wish to subject the human or other animal body to the magnetic influence of passing electric currents, not surrounding but passing along the same in straight or waving lines or planes, by means of portable conducting apparatuses, I sew or fasten to a piece or pieces of leather or other like fabric suitable metal wire or band bent into such lines as may be conducive to the intended effect. The wires or bands are most conveniently insulated by caoutchouc or other like impermeable material to preclude the extralation, and the piece or pieces of leather are provided with bands to be fastened to the body. The ends of the wires are left loose, in order that they may be connected with the electric source. Figures 24 and 25 represent specimens of such portable conducting apparatuses. When the wires or bands have strength sufficient to remain in their positions, and be fastened themselves to the body by bands, the leather lining may of course be dispensed with. The same remark applies to leather tubes, when used for coils for surrounding parts of the body.

Figure 26 represents a coil of strong insulated wire wound upon a core, and held together, when the core is removed, by strips of gutta percha *a*, *a*, laid on in a plastic state, so that when cooled they adhere closely to the coil. *b*, *b*, *b*, are bands by which the coil may be fastened to the body. The coil is applied so that the tube formed by it stands vertically on the body, or at right angles to it; and the effect may be encreased or modified by a core of iron being inserted into the tube or opening of the coil; but the height of the coil in the direction of its axis should not exceed one inch to be worn without inconvenience. The apparatuses last herein-before described I employ for producing magnetic effects on certain parts of the human or other animal body, where it is not deemed advisable to magnetize the whole bulk of that part. They are fastened by means of bands or otherwise to the body, and lay close to the same, and the free ends of the wire are connected with the conductors or poles of an electric apparatus, when the electric current, passing through the wire or metal band of the portable conducting apparatus, will exercise a magnetic effect on the body according to the power, direction, and constancy of the current, and the figure described by the wire.

Sixthly, the object of my Invention is to subject two different parts or places of the human or animal body at any distance from each other to the influence of one or principally one polarity only of magnetism, to the exclusion or nearly the exclusion of the other polarity. Either the same polarity may be applied to both parts or places, or a different polarity to each. I effect this by means of portable chains or series of alternate steel magnets and rods of soft iron, connected so that the rods of iron engross or nearly engross the magnetism throughout all the magnets, with the exception of the last two poles ending the series on both sides.

Figure 27 represents a side view of such a series of alternate magnets *a*, *a*, *a*, *a*, and iron rods *b*, *b*, *b*, the two free pole ends being of different magnetic polarities. The ends of the magnets are fitted into incisions in the rods, not loosely, but still so freely as to allow of the magnets or rods being moved or turned to a certain extent sidewards round the rivets or screws *c*, *c*, *c*, *c*, which go through holes in the rods and magnets, and thereby fasten them together. I arrange the magnets in this instrument so that the two poles bound by the same rod are of different polarities, so as to act in accordance on the magnetism of the iron. At the end of the free poles bands are drawn through small holes in the magnets, to fasten the apparatus to the body. It will be obvious that the magnetism of the poles being let into the iron rods is altogether, or nearly so, engrossed by the soft iron, thereby exercising much less power of magnetism on external objects than the free poles, and that when the apparatus is applied (for instance) with one free pole on one side and the other free pole on the other side of the neck or breast, the parts of the body between the free pole ends are exempt, or nearly so, from magnetic influences, and that each of the spots where the end poles are applied will be subjected to one, or principally one, polarity only. The apparatus may of course be made of any length proportioned to the distance between the parts of the body to be influenced by the free pole ends by multiplying the number of links or encreasing their length. The length of the iron rods I make about one half or two thirds of the length of the magnets. When the free end poles are required to be of the same polarity, I make one iron rod of double length and larger in the middle, and place into both ends of it magnet poles of the same polarity, as shewn by the rod *r* in Figure 24. In place of the magnets inserted into iron rods, with their poles in the apparatuses represented, pieces of soft iron may be added, using steel magnets only for the end pieces; or instead of iron rods in the middle of the series magnets may be employed, each placed with its negative pole opposite to the positive pole of the next adjoining magnet, and vice versa; but I find the alternate magnets and iron rods preferable.

Seventhly, the object of my Invention is to produce a magnetic effect of one or principally one polarity only on certain parts of the body by means of portable transversal magnets or other magnetic apparatuses constructed so as when applied to present only one polarity to the body, the other pole being on the side turned from the body. I employ for this purpose bars or pieces of steel magnetised transversely, or helixes of steel wire magnetised transversely, so that one line of the circumference of the helix parallel with its axis shall present one polarity, and the opposite side of the circumference a line of the other polarity. Or I employ portable magnets magnetised longitudinally, but applied perpendicularly, or at right angles to the body, with one pole turned towards and the other poles turned from the same, fastened in suitable bandages to keep them in their positions.

Figure 30 is a side view of a bar of steel magnetized transversely, and fastened to an arm by the bands *a*, *a*, the letters N and S indicating the north and south polarities.

Figure 31 represents a circular helix of steel wire to be worn round an arm or a leg, the letters N and S indicating the direction in which it is magnetized.

Figure 32 represents a series of small magnets *a*, *a*, *a*, magnetised in the direction shewn by the letters N and S. *b*, *b*, *b*, is a bandage of leather into which the magnets are inserted and fastened, and *c*, *c*, is wool or cotton sewn to the leather bandage, and filling up the intervals between the magnets on the one side to be applied to the body, in order to prevent the ends of the magnet from rubbing or fretting the skin.

Eighthly, the object of my Invention is to employ the galvanic currents excited between two pieces of different metals metallically connected, by means of the natural moistness of the skin or artificial moistness applied to it, or by means of the body to which the pieces of metal are applied, all as described under the third head of this Specification, for exercising the magnetic influence accompanying a galvanic conductor (as described under the fifth head) on the body to which the apparatus is applied. For this purpose I lead the wire or other piece of metal connecting such metals, or effect their metallic connection, not in the direct or shortest way, but make the conductor uniting them pass the body in a direction and length adapted to the effect intended to be produced; or I connect the conductors with portable conducting apparatuses of the kind described under the fifth head of this Specification, taking care that the resistance of the metallic connection is inferior to the intensity of the current or currents which are to be conducted. It is of course essential that the two metals be arranged or applied so that their only metallic connection shall be through the conductor, and I therefore separate or keep them from each other by insulating substances, such as gutta percha, when they are to be applied to the body in such manner that the movements of the same may influence their relative positions, and thereby produce a direct contact.

Figure 33 is a side or upper view of an apparatus to be applied round the thick part of an arm. *a* is a piece of zinc. *b*, a piece of copper which, when the apparatus is applied, shall lay on each side of the arm with pieces of linen or sponge *i*, *i*, saturated with salt water between them and the skin. *c*, *c*, *c*, is the coil formed by an insulated wire connecting the two metals, as shewn in the Drawing, and surrounding the plates and the arm. It being essential that the conductor should as far as possible be one uninterrupted metallic body, to allow the currents to pass easily, I solder the conducting wire to both plates, supposing always the part of the body to which the encircling apparatus is to be applied is of the same or greater thickness than any part of the body over which the wire must be passed up or down, in order to be fitted to the part where it shall act. When such is not the case, as, for example, when the apparatus is intended for the neck, the plates must be applied first with one end of the wire soldered to one of the plates, and the coil wound round the neck, after which the other end of the wire must be fastened by a screw or otherwise to the second plate.

Figure 34 represents a front view of an apparatus consisting of one plate of zinc *z*, and one plate of copper *c*, sewed or fastened to a strong piece of gutta percha *a*, *a*, *a*, *a*, with a small interval between them *b*, *b*. The conducting wire *i*, *i*, is soldered one end to the zinc and the other to the copper, before the plates are fastened on to the gutta percha, and the wire forms a coil or other figure *f*, or it is divided and metallically connected with portable conducting apparatuses, as described under the fifth head of this Specification, all of which are to be applied where a magnetic effect is required to be produced, proceeding from the galvanic currents that may ensue when the metal plates of the apparatus represented in Fig. 34 are both applied to moist skin. An apparatus such as shewn in Fig. 34 may also be made to connect the ends of a series of plates, as represented in Figure 14, by the end wires at c^1 & c^2, being soldered one to the copper *c*, and the other to the zinc *z* of the apparatus, thereby adding the effects of currents traversing the whole circuit of the series to the other more local galvanic and magnetic effect of such apparatus.

And having now described the nature of my said Invention, and in what manner the same is to be performed, I declare that I do not restrict myself to the use of any of the instruments or apparatuses or arrangements figured in the annexed Drawings, and herein-before described, the same being intended merely as exemplifications of the different modes or methods devised by me of applying galvanism and magnetism to curative and sanatory purposes, and these modes or methods admitting of an endless variety of forms and modifications; but that the improvements which I claim as constituting my said Invention are as follows:—

First, I claim the employment for curative and sanatory purposes of portable electro magnets constructed and operated with in the manner before exemplified and described.

Second, I claim the method of employing for the said purposes the influence of portable magnets, protected from oxidation by a thin coating of gold or gutta percha, or other like incorrodible and not easily permeable substance, as before described.

Third, I claim the combination of portable magnets or electro magnets, and portable galvanic apparatuses, for the purposes aforesaid, as before exemplified and described.

Fourth, I claim the modes or methods of producing long continued galvanic or magnetic effects on animal bodies by means of portable galvanic apparatuses attached to such bodies (but independent thereof for the moist element), as before exemplified and described.

Fifth, I claim the modes or methods of producing magnetic effects on animal bodies, or parts thereof, by transmitting electric currents along or around the surfaces thereof, by portable conducting apparatuses, as before exemplified and described.

Sixth, I claim the application of portable magnetic apparatuses to animal bodies in such manner that one or principally one polarity only of magnetism shall act on each of two different parts of the said bodies, and so also that either one and the same polarity shall effect both parts or a positive polarity affect one part and a negative polarity the other, wholly irrespective of the distance between those parts and of their relative positions, all as before described,

Seventh, I claim the method of producing a long continued effect of one or principally one polarity only on certain parts of animal bodies, by means of portable transversal magnets, or by portable magnets applied perpendicularly or at right angles, as before described. And,

Eighth, I claim the application of the galvanic currents (generated by such portable galvanic apparatuses as are described under the third head of the Specification) to exert a magnetic influence on animal bodies as explained under the fifth head), by the modes or methods described under the eighth or last of this Specification.

In witness whereof, I, the said Charles Ludovic Augustus Meinig, have hereunto set my hand and seal, this Seventeenth day of May, in the year of our Lord One thousand eight hundred and fifty.

CHARLES LUDOVIC AUGUSTUS (L.S.) MEINIG.

AND BE IT REMEMBERED, that on the Seventeenth day of May, in the year of our Lord 1850, the aforesaid Charles Ludovic Augustus Meinig came before our said Lady the Queen in Her Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose.

JEFFERSON.

Enrolled the Seventeenth day of May, in the year of our Lord One thousand eight hundred and fifty.

LONDON:
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1857.

A.D. 1849. Nov. 17. Nº 12,847.
MEINIG'S SPECIFICATION.

(1 SHEET)

FIG. 1.

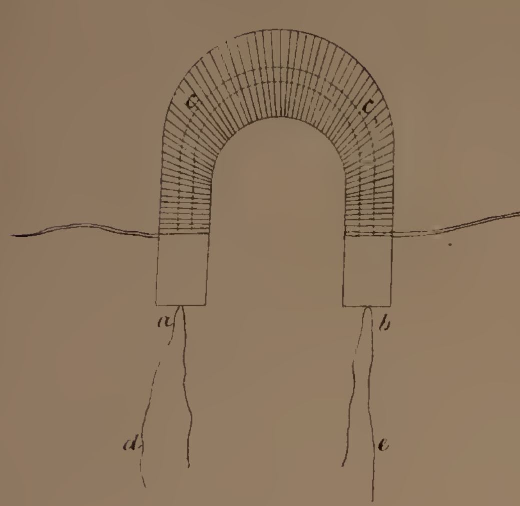


FIG. 2.

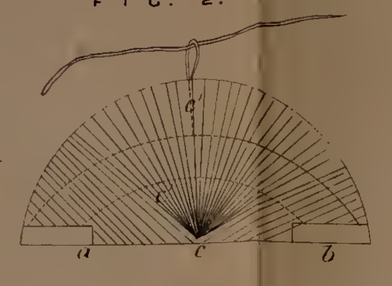


FIG. 3.

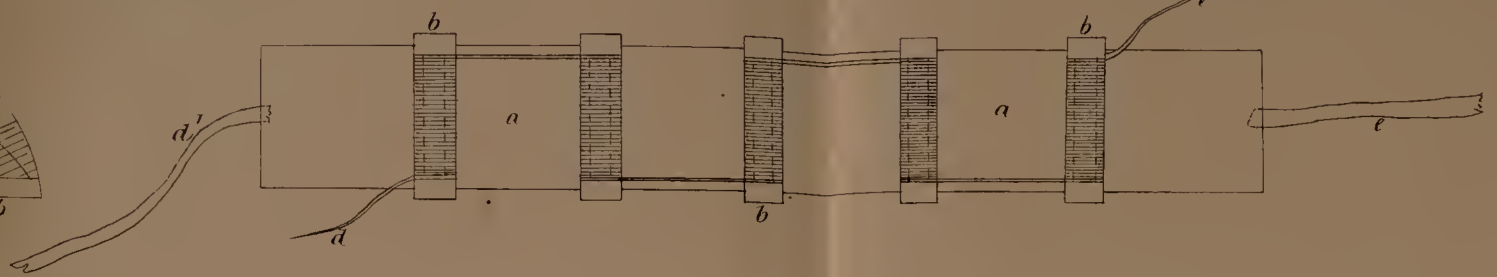


FIG. 20.

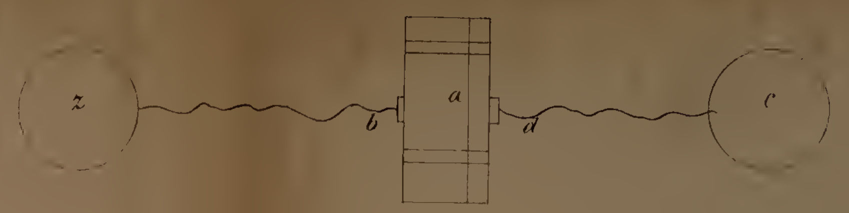


FIG. 4.

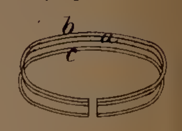


FIG. 2.

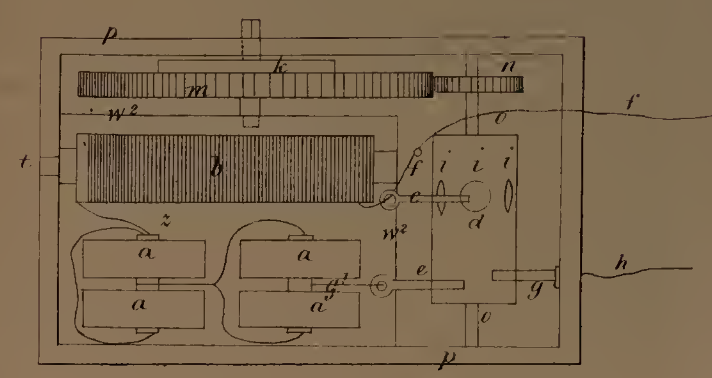


FIG. 5.

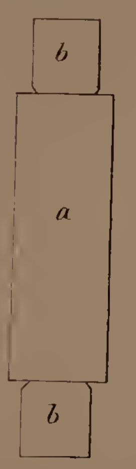


FIG. 6.

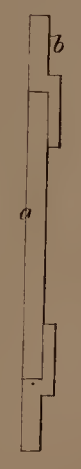


FIG. 7.

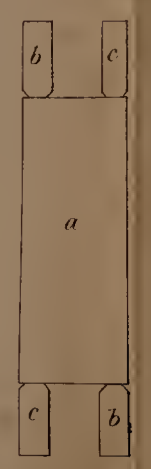


FIG. 8.

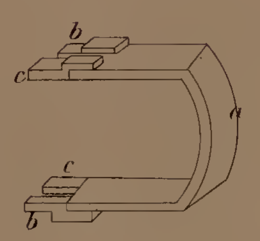


FIG. 9.

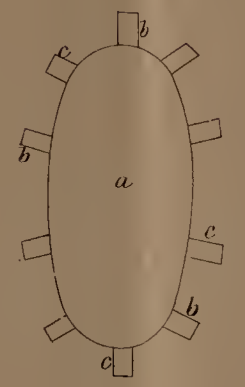


FIG. 10.

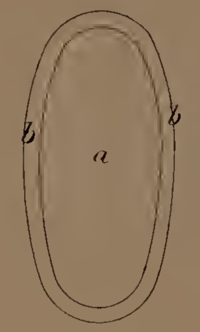


FIG. 11.

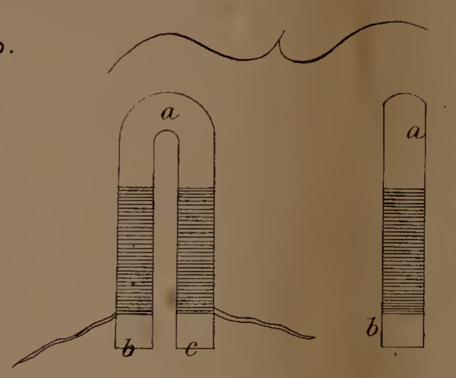


FIG. 22.

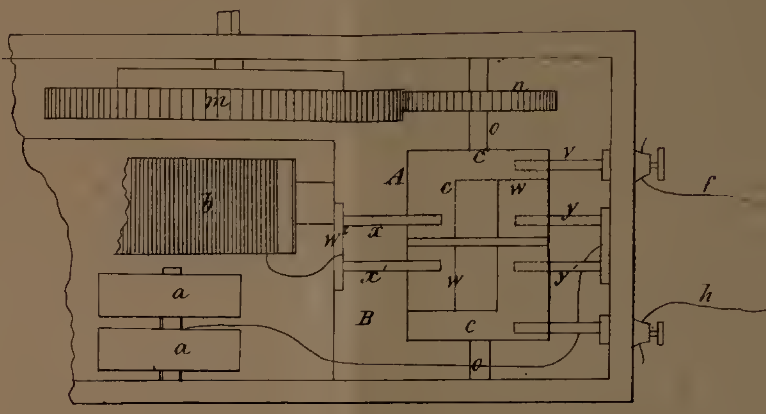


FIG. 23.

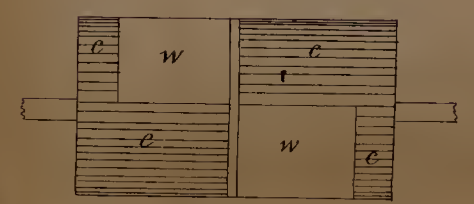


FIG. 24.

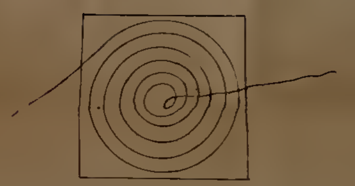


FIG. 25.

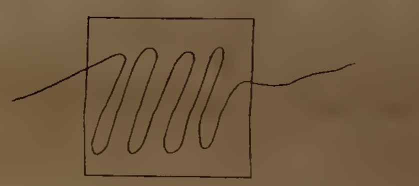


FIG. 12.

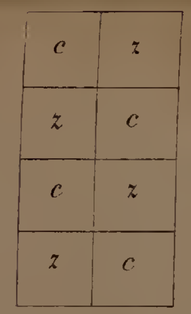


FIG. 13.

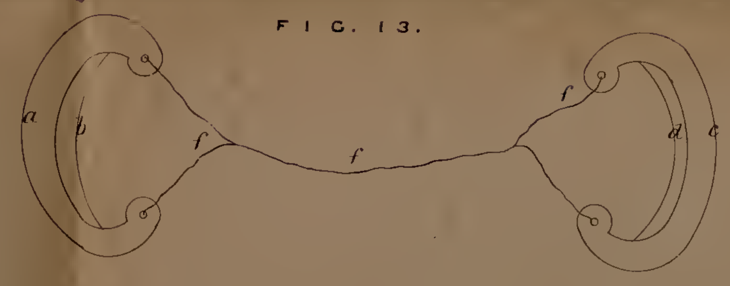


FIG. 14.

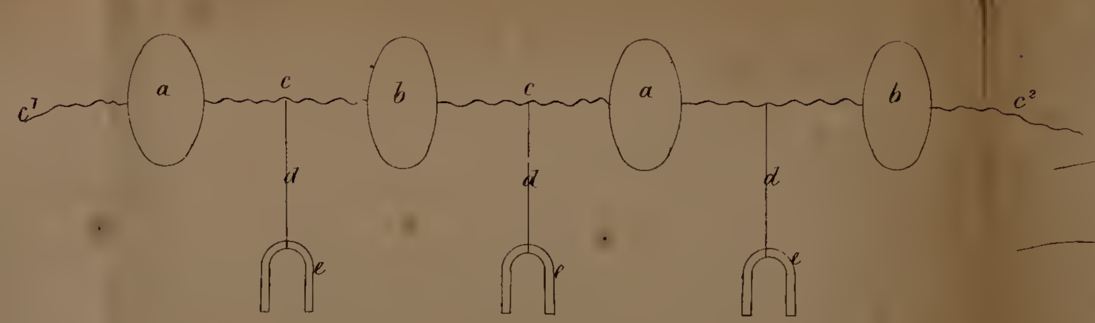


FIG. 26.

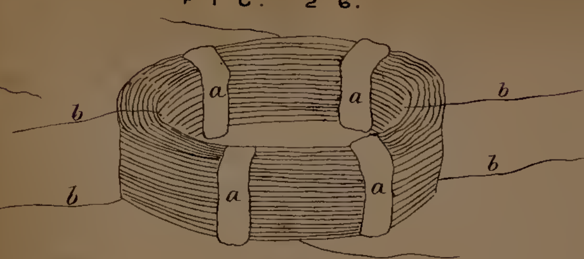


FIG. 31.

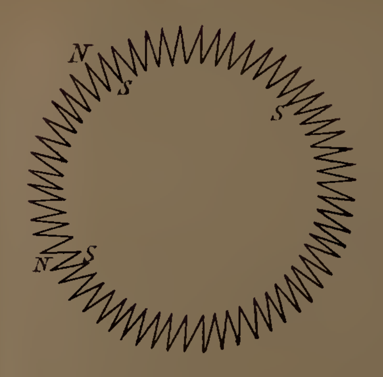


FIG. 15.

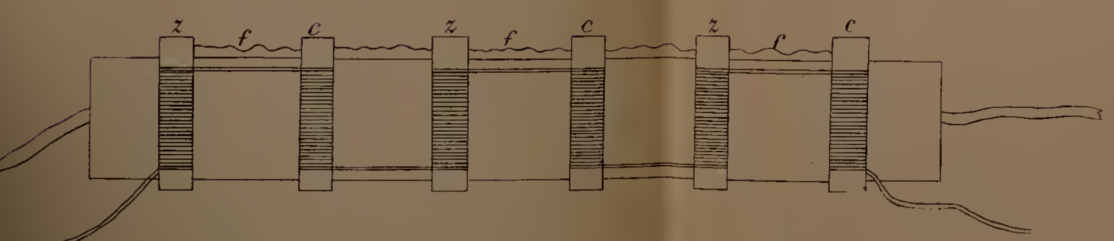


FIG. 17.

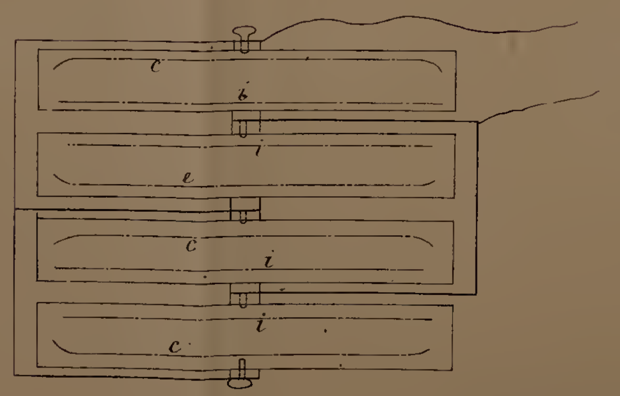


FIG. 27.

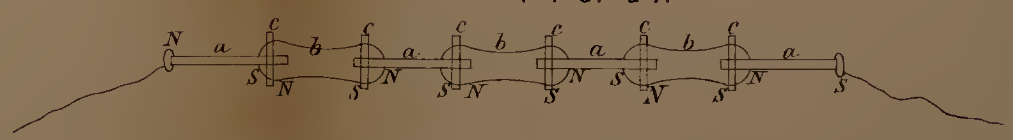


FIG. 28.

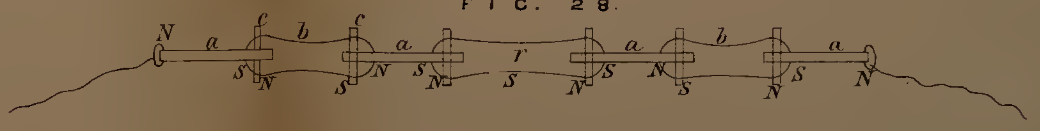


FIG. 32.

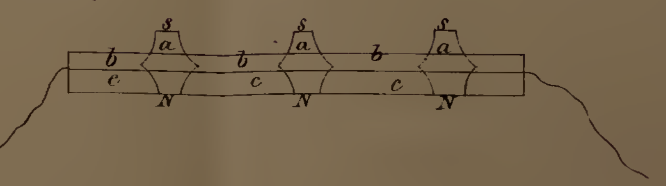


FIG. 30.

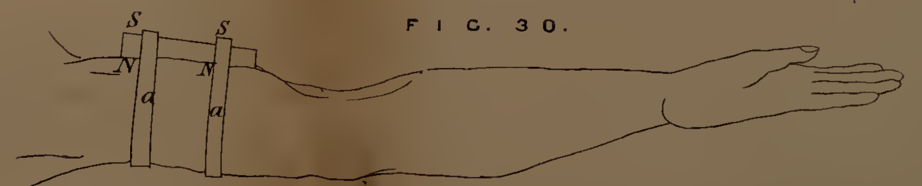


FIG. 16.

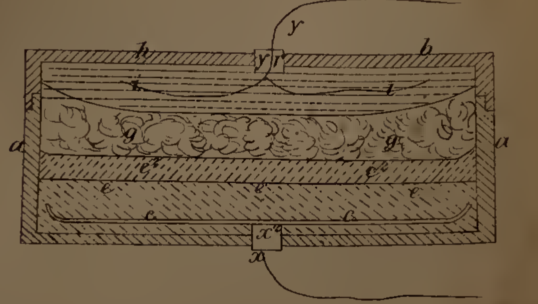


FIG. 18.

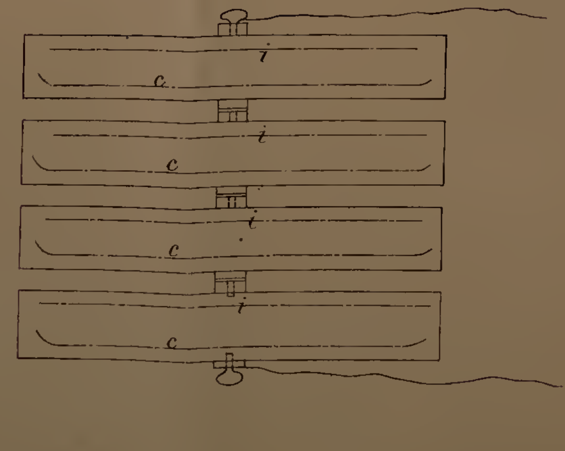


FIG. 33.

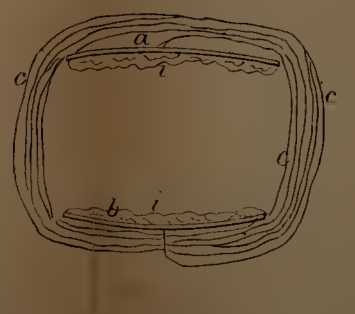


FIG. 34.

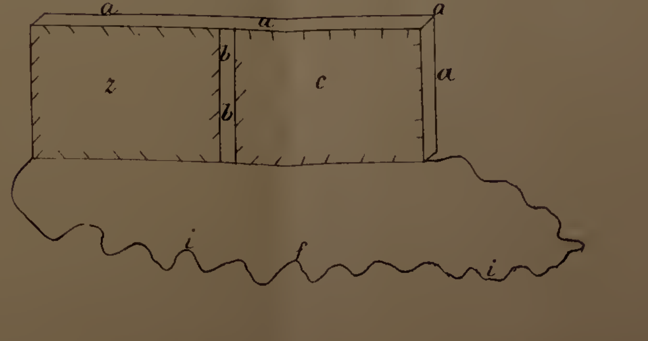
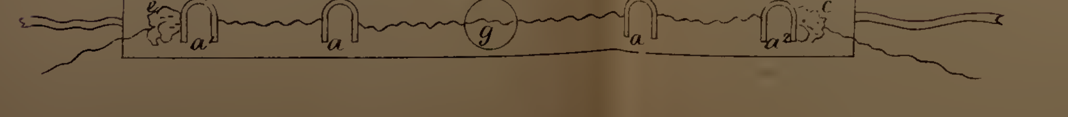


FIG. 19.



[illegible] drawing is colored.

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LONDON: Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,